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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,463	02/11/2002	Andrey Rzhetsky	AP34006 070050.1942	4349
21003	7590	11/15/2004	EXAMINER	
BAKER & BOTTS 30 ROCKEFELLER PLAZA NEW YORK, NY 10112			ZEMAN, MARY K	
			ART UNIT	PAPER NUMBER
			1631	

DATE MAILED: 11/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/073,463

**Applicant(s)**

RZHETSKY ET AL.

**Examiner**

Mary K Zeman

**Art Unit**

1631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 August 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 8/03 12/02
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

Applicant's election with traverse of Group II in the reply filed on 8/19/04 is acknowledged. The traversal is on the ground(s) that the claims are coextensive in scope, and would not pose an undue search burden upon the examiner. Upon further consideration, these arguments are persuasive, and all claims are examined herein.

***Priority***

Priority to a series of provisional applications is acknowledged. The earliest filed provisional which contains an enabling disclosure for the claimed invention is 60/323599, filed 9/20/01, and all claims are accorded that filing date.

***Information Disclosure Statement***

The IDS papers submitted 8/2003 and 12/2002 have been entered and considered. Initialed copies of the PTO-1449 forms are included with this action.

***Drawings***

The drawings are objected to because the figures are extremely small, rendering many details unreadable. For example, the labels of the axes in Figure 2, and the identification of the data points are unreadable in the IFW image. The images of Figures 3, 6, 9, 10, 11 and 12 are similarly difficult to read. The Photographs of Figures 4 (a)-(c) are small, dark, and difficult to interpret. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the

Art Unit: 1631

drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. **The objection to the drawings will not be held in abeyance.**

### *Claim Rejections - 35 USC § 101*

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims are drawn to methods of identifying probabilities of interactions between data representing molecules. The steps of the methods end with the calculation of a probability figure, which is not a concrete, tangible and useful result, as required. MPEP 2106: "For such subject matter to be statutory, the claimed process must be limited to a practical application of the abstract idea or mathematical algorithm in the technological arts. See *Alappat*, 33 F.3d at 1543, 31 USPQ2d at 1556-57 (quoting *Diamond v. Diehr*, 450 U.S. at 192, 209 USPQ at 10). See also *Alappat* 33 F.3d at 1569, 31 USPQ2d at 1578-79 (Newman, J., concurring) ("unpatentability of the principle does not defeat patentability of its practical applications") (citing *O'Reilly v. Morse*, 56 U.S. (15 How.) at 114-19). A claim is limited to a practical application when the method, as claimed, produces a concrete, tangible and useful result; i.e., the method recites a step or act of producing something that is concrete, tangible and useful. See *AT & T*, 172 F.3d at 1358, 50 USPQ2d at 1452. Likewise, a machine claim is statutory when the machine, as claimed, produces a concrete, tangible and useful result (as in *State Street*, 149 F.3d at 1373, 47 USPQ2d at 1601) and/or when a specific machine is being claimed (as in *Alappat*, 33 F.3d at 1544, 31 USPQ2d at 1557 (in banc))."

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 1631

Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The metes and bounds of claim 1 are unclear. The steps of “representing” “computing” and “using” lack definition as they fail to set forth positive active steps or calculations to be performed in carrying out the method. How are the molecules represented? What aspect of the molecule is represented? Size? Location? Identity? What features of the molecules are required to be represented such that the “computing” step can be performed. Is merely representing the size of an atom enough for computing an attraction probability? Are all the molecules in the system represented? Are all compared with one another? Is the computing for each entity against every other entity pairwise? Or are some selectively used in the computing? Is it an iterative process, or batch? How is the computation “used” to identify the probability or an interaction in a biological network? Is there a comparison to another type of network?

Claims 2 and 3 have the same problems as claim 1.

It is unclear where the limitation of claim 4 should be added to the methods of claims 1, 2 or 3. Further in claim 4, how is the topology of a network computed? What is “a more realistic topology”? to what is it compared?

In claim 5, what if the molecules being represented are not proteins (in depending from claim 1)? How can the conserved features be protein domains or motifs? Similarly with claim 6, what if the molecules being represented are not nucleic acids (in depending from claim 1)? How can the conserved features be nucleic acid domains or motifs?

In claims 7-11, 15, what are the differences in the equations, and how does each further the goal of identifying interaction probabilities? What data is used with what variables? Not all the variables for all the equations are defined in the specification, let alone how the data from claims 1-3 is collected such that it can be used in the equations.

The metes and bounds of the term “posterior probabilities” in claims 12-15 are unclear. It is unclear how this is to be computed, and how it differs from any other type of probability.

In claim 14, it is entirely unclear how an entire statistical “technique” is to be applied to the methods of claims 12 or 13. This claim does not concretely set forth what is to be computed on what data by what means.

Art Unit: 1631

Claims 16 and 17 are vague and indefinite as it is entirely unclear how one is to integrate the “predictive” data manipulations of claims 1-3 with the “wet” testing steps of claims 16-17. Claims 1-3 only identify a probable interaction, not an actual one, and no interactions are confirmed or actually identified. No specific proteins or molecules are identified, merely probabilities of interactions of conserved features. No proteins or molecules are made, selected or purified such that they can be contacted with any test compound. Therefore, there is no basis for comparison.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 4, 6, 12, 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al (2002/0087275).

The claims are drawn to methods of identifying predicted probabilities of interactions of molecules that can be proteins or nucleic acids. The claims represent the molecules as conserved features, the features are used to calculate an attraction potential, which is used to predict the probability of an interaction.

Kim et al. (US 2002/0087275 A1 having priority to at least 7/31/01) discloses methods of identifying potential interactions between molecules in a database. Features of the all molecules of a given system (proteins in a two-hybrid analysis) are identified and stored, compared pairwise, and used to calculate the potentials for interaction. Kim et al then use the predicted interactions to graph the network, and the graphing appears to use the same edge/vertices



Art Unit: 1631

theories as those set forth in the specification. These steps appear to meet the limitations of the rejected claims.

Claims 1-3, 5, 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Askenazi (US 6,594,587).

Askenazi discloses methods of determining the probability of interactions (or associations) between biological molecules or elements of a biological network. Askenazi utilizes graph theory to combine graphs relating elements of a biological network, and to produce Steiner Tree subgraphs which illustrate this network. The methods of Askenazi use any methods which are capable of producing a Steiner Tree, which include methods of predicting attraction or interaction (col. 6) Askenazi contemplates differential weighting of the probabilities or predictions to prioritize certain relationships (claims). As such, this disclosure appears to meet the limitations of the rejected claims.

### *Conclusion*

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary K Zeman whose telephone number is (571) 272 0723

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P Woodward can be reached on (571) 272 0722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

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Art Unit: 1631

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MARY K. ZEMAN  
PRIMARY EXAMINER  
10/16/01 11/10/01